THE WILDERNESS INSTRUCTOR/ORIGINAL RESEARCH

Mountaineering and Climbing Techniques in the Curriculum of Mountain Medicine Education Programs: A Survey of the European Courses for Mountain Medicine

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Mountain medicine education programs have been described and discussed from several perspectives. A Union Internationale des Associations Alpinistes–Internationale Kommission für Alpines Rettungswesen–International Society for Mountain Medicine (UIAA-IKAR-ISMM) label was defined and subsequently awarded to courses that comply with certain minimal requirements. These courses can award an international UIAA-IKAR-ISMM diploma to their successful candidates. The need for mountaineering training was listed in those minimal requirements, but no exact recommendations were given. A complete analysis of existing mountain medicine education programs in Europe is done, providing information about the practical mountaineering and climbing techniques taught in the different courses and, if applicable, the practical requirements and examinations to obtain the above-mentioned diploma. The analysis clearly shows the widely varying requirements for proficiency in mountaineering and climbing in European mountain medicine courses.

Key words: mountain, mountaineering, climbing, mountain medicine, mountain medicine education

Introduction

Mountain medicine education has established itself as an important part of continuing medical education in sports medicine.^{1,2} All educational programs in mountain medicine in Europe have previously been presented, detailing their history, evolution, and ongoing status.¹ Recent developments have been documented, and approximate numbers of participating doctors were calculated.² An international UIAA-IKAR-ISMM label has been created by these 3 international bodies (UIAA, Union Internationale des Associations Alpinistes; IKAR, Internationale Kommission für Alpines Rettungswesen; and ISMM, International Society for Mountain Medicine) and serves as a quality marker of courses to which it is issued. These courses comply with the minimal requirements defined by these international bodies (Table 1).^{3,4}

Although the requirements enumerated in the UIAA-

IKAR-ISMM label state the need for mountaineering training,³ no exact recommendations are given as to how this training should be performed or whether any specific techniques should be taught. This article offers an analysis of all mountain medicine courses in Europe and provides information about the practical mountaineering part of the course, with particular focus on practical mountaineering requirements for successful completion of the courses, with a diploma or certificate, where applicable.

Materials and methods

In cooperation with Dr Bruno Durrer, the president of the UIAA MEDCOM (Medical Commission of the Union Internationale des Associations Alpinistes), all directors of educational programs in mountain medicine in Europe were sent a standardized English letter explaining the exact purpose of the study, together with a questionnaire. This letter asked the course directors to provide a general comment about their course and to answer the detailed questions (Table 2). After reviewing the re-

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Table 1. Approved courses of mountain medicine (UIAA-IKAR-ISMM label); organizers, country, and year of approval; original UIAA MedCom data

Austrian Society for Mountain and High Altitude Medicine and German Society for Mountain and Expedition Medicine, Austria and Germany (1997)
University of Zaragoza, Spain (1997)
Catalonian Society for Mountain and High Altitude Medicine, Spain (1997)
Nordbadischer Sportärztebund, Germany (1998)
Swiss Society for Mountain Medicine with the MedCom of the Swiss Alpine Club, Switzerland (1998)
University of Padova, Italy (1999)
Universities of Bobigny and Toulouse (Diplôme Interuniversitaire de Médecine et Urgence en Montagne), France (2000)

sponses, individual letters were sent to the different organizers to solicit answers to questions not detailed in the original information material provided. Personal discussions with organizers of the mountain medicine courses provided further information with regard to the practical aspects of their specific educational program.

Results

Thirteen courses are held in the following European countries (in alphabetical order): Austria ($n = 1$), France

($n = 3$), Germany ($n = 1$), Italy ($n = 2$), The Netherlands ($n = 1$), Spain ($n = 2$), Switzerland ($n = 1$), and the United Kingdom ($n = 2$).

An in-depth description of the answers to the detailed questions (Table 2) follows.

AUSTRIA/GERMANY (COOPERATION, TABLE 1)

A variety of courses are offered in these 2 countries: basic, summer, winter, and expedition courses. No special prerequisites are necessary to enroll in the basic course other than a good general physical fitness. To enter the summer course, the basic course must have been successfully completed, and general physical fitness is required. For the winter course, the candidate must be able to ski in all types of deep snow. Finally, to access the expedition course, the doctor must have passed the diploma for mountain medicine and be experienced in high-altitude climbing. Candidates are asked to leave the training course if trainers find their practical qualifications inappropriate for the course level.

For each course, climbing education takes approximately 40 to 50 hours. This consists of basic education as well as individual improvement sessions for advanced climbers. All techniques of summer and winter alpinism and altitude climbing are covered. Each training group is directed by a highly experienced professional mountain guide and consists of 4 to 5 persons in the basic, summer, and expedition courses and of 7 to 8 persons in the winter course. No specific criteria are used to form the different training groups.

The practical requirements needed to obtain the final UIAA-IKAR-ISMM diploma encompass the ability to lead climbs in rock and ice up to Degree III UIAA as well as ski mountaineering in high mountains in all snow conditions. Participants are notified of these requirements prior to enrollment.

In each course, the mountain guide responsible for each group makes an individual evaluation of the dif-

Table 2. Detailed questions contained in the standardized letter to the course organizers (original wording)

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1. Are there any prerequisites for the candidates relative to mountaineering experience?
 2. What are the exact practical hands-on teaching sessions in the course (eg, how many, structure, content, location, and time frame)?
 3. What criteria are used to form the various groups for those teaching sessions in the course?
 4. What are the exact practical requirements and skills needed to pass the course or to obtain the international diploma or final certificate of the course (if applicable)?
 5. Are these requirements clearly outlined to the participants beforehand (eg, list of requirements)?
 6. How are these skills tested? What examinations in practical mountaineering are done?
 7. How are candidates informed about their test results? What kind of action can they take against a negative result?
 8. Are there any national or international (nonprofessional or professional) qualifications in mountaineering education (voluntary leaders in mountain walking or rock climbing as defined in the UIAA brochure "Model training standards for voluntary leaders and instructors") accepted as being equivalent to the practical requirements?
 9. Is there an option to have the practical experience gained in the mountain medicine courses accepted toward national mountain awards curricula of the appropriate bodies (eg, alpine clubs)?
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ferent participants based on “climbing” and “rope-handling” ability. Participants are informed of their evaluation at the end of each course. Advancement to the next course is dependent on a positive evaluation. All 3 courses must be passed with a final positive evaluation in order to enter the final theory exams. These are held once a year in coordination with a major mountain medicine congress or event. In the case of a negative evaluation (failure to fulfill the practical requirements), the candidate cannot take any specific action except repeat the complete course.

No previous qualifications in mountaineering are accepted as an equivalent to the practical requirements tested in the different courses.

FRANCE

Diplôme Interuniversitaire de Médecine et Urgence en Montagne (Interuniversity Diploma for Mountain Medicine and Emergency), offered by UFR Santé Médecine Biologie Humaine, Bobigny, Université Paris 13, and UFR Médecine Toulouse, Université Paul Sabatier

To enter the diploma courses, the candidate must possess a medical license either in France or in another country that provides an equivalent recognized license. Students in the final year of their studies can participate but will receive the final diploma only after receiving their respective medical license. The selection process encompasses the submission of a curriculum vitae together with a complete list of all mountain days and a personal interview. Candidates must demonstrate a motivation for mountain medicine and must have, prior to the course, a broad experience in mountaineering. Good general physical condition with no contraindications to a stay at high altitude is a prerequisite.

Overall, the course is divided into 6 different modules, which contain varying degrees of practical hands-on work and teaching. Different rescue techniques are shown and tested in various environments (ie, in winter conditions, canyoning, and speleology). All techniques for mountaineering in isolated regions as well as in the classic context of the Alps are rehearsed. The general purpose of the course is not to create high-level alpinists but to teach physicians who are already good mountaineers basic rescue practice in various mountain activities.

To pass this course, the candidates must pass a theoretical exam about the curriculum and meet the requirements defined by the mountain guides and the doctors in charge of the practical sessions. These consist mainly of the ability to participate in a rescue in various situations (eg, expedition, rock climbing, ski mountaineering,

speleology, canyoning, night rescue, etc.). Candidates are notified of this list of requirements at the beginning of the course.

As the course is considered to be a medical course, in distinction to a practical mountaineering course, tests concentrate on medical skills adapted to the mountain environment. Only basic maneuvers concerning progression and safety are assessed.

Within the setting of the course, there is continuous exchange among the candidates, guides, and rescue doctors. This promotes further improvement of mountain techniques of the participants during the practical sessions.

No specific training is accepted as an equivalent to this course, and practical experience cannot be routinely used to gain any national mountain awards.

Mountain and rescue medicine course, offered by the University of Grenoble

As this mountain medicine course has a particular emphasis on mountain rescue and emergency medicine, the organizers stress the fact that participating doctors must be technically independent with the ability to move on their own in the mountains, even under very difficult situations, without being a burden to participating rescue mountain professionals. In this respect, they ask that the candidates be able to lead Level 5 (French classification) or second level 6a in classic rock-face climbing. Furthermore, candidates must be very good alpine skiers. Candidates who have passed a national diploma in skiing or mountaineering (eg, trainer diplomas) are preferred. The selection process is based on the technical level in mountaineering as well as the specific medical subspecialty of the candidates.

Routinely, there is no formation of subgroups. In the event of serious high alpine mountain climbs, the participants are divided into homogenous teams.

During all practical sessions, mountaineering and climbing abilities are evaluated by the accompanying guides and rescue doctors. One day of the course is dedicated to a long alpine climb with an altitude difference of 1200 m in order to test the physical fitness and stamina of the candidates.

There is no cooperation with the CAF (Club Alpin Français) or the FFME (Federation Francaise de Montagne et d' Escalade) in order to accept any educational programs in mountaineering as an equivalent to any requirements or to have the practical mountain sport curriculum of the medical course recognized for any technical purposes.

GERMANY

The goal of this course offered by the University of Heidelberg, Internal Medicine VII: Sportsmedicine in cooperation with the Nordbadischer Sportbund is to teach general practitioners (as well as interested specialists from various backgrounds) theoretical and practical aspects of mountain medicine in order to enable them to counsel patients and mountaineers in their office in relation to high-altitude medicine. The course does not aim to create mountain rescue doctors or expedition doctors, as this requires special theory modules as well as excellent mountaineering experience in different situations. To this end, there are no prerequisites for candidates. The alpine experience of the different participants therefore varies greatly, with approximately 25% of the participants being total beginners in mountain sports.

In the summer course, practical sessions start with the teaching of basic techniques in rock and ice for 2 days. This is followed by 2 full mountain days, during which these techniques can be put into practice and various other techniques (eg, crevasse rescue, orientation, and route planning) can also be emphasized. On the last day of the summer course, there is a major organized mountain rescue simulation in rock and ice in which all candidates participate.

In the winter course, after an initial introduction to the equipment and the techniques of ski and winter mountaineering, a daily ski tour is performed with additional exercises such as bivouac building, avalanche rescue, and snow profile. The teaching in mountaineering is undertaken by specially trained mountain guides.

Following the goal and the philosophy of the course explained above, no examination of the practical skills is performed during or at the end of the course.

As there are no exams in practical mountaineering, there is no need to accept any qualifications in mountaineering as being equivalent. There is no option of having the practical exercises accepted toward a national curriculum of mountaineering training.

ITALY

Mountain medicine rescue course organized by the University of Modena

This course is currently being completely restructured, and in this context, no definite information can be given relating to future courses. For the courses that took place from 1993 to 2000, the following general rules applied. No prerequisites relative to mountaineering experience were requested in the form of a list of climbs or a technical evaluation; however, the candidate had to be presented by his section of the alpine club. In this way,

each region of Italy, corresponding to a section of the national alpine club, had 1 or 2 slots for its own doctors. The course had a practical and a theoretical section; the latter was evaluated by a written exam, with the first part generally evaluated by the instructor guides of the CNSAS (National Corps for Alpine and Speleological Rescue).

Course of general mountain medicine organized by the University of Padova

The course organizers expanded the 1999–2000 course by several hours to meet the standard time requirements³ of the UIAA-IKAR-ISMM label (Table 1).

Prerequisites concerning practical mountaineering experience are not announced but are replaced by official norms to fulfill and receive the UIAA-IKAR-ISMM diploma. The course organizers request a full 100-hour course of mountain medicine as well as a regular Italian alpine club mountaineering course, in which the participants are trained in both rock and ice climbing up to the UIAA Degree IV. In this respect, the practical mountaineering requirements are well known to the participants, who are trained and examined in the aforementioned specific course of the Italian alpine club.

The practical hands-on sessions include orientation and navigation exercises under all weather conditions, an avalanche rescue in the winter, and a helicopter rescue as well as ground rescue training in the summer. In addition, rock climbing and the use of alpine equipment on both rock and ice are performed with professional instructors or voluntary leaders of the alpine club. In this system, a national alpine course is requested as equivalent to practical knowledge and experience. Candidates can nevertheless participate in the mountain medicine course without having done the mountaineering course of the Italian alpine club; however, in this case, they will receive only a certificate of the University of Padova, not the international UIAA-IKAR-ISMM diploma. If the professional instructors have the impression that the candidate appears inadequate and does not have enough mountaineering experience despite taking the alpine course, a negative evaluation can be given, and the candidate will not be eligible for the international diploma.

THE NETHERLANDS

The course offered in the Netherlands is an information weekend, in which national and international speakers introduce specific aspects of mountain and mountain rescue medicine to the participants. No teaching in practical mountaineering or climbing techniques is offered.

SPAIN

University courses of specialization in emergency mountain medicine organized by the University of Zaragoza

This course is divided into 5 modules, which lead to various postgraduate certifications.¹ After successfully completing Module 1 (110 hours), the international diploma UIAA-IKAR-ISMM can be obtained.

No specific prerequisites are asked for, but “minimum mountaineering knowledge” is advisable. The Spanish mountaineering school in Benasque organizes special mountaineering courses prior to university courses to help interested doctors achieve and accredit to this level. During Module 1, teaching of mountaineering knowledge allows the student to achieve a guaranteed “minimum knowledge.” At the end of Module 2, the student must then achieve the “optimal mountaineering knowledge.” There are 10 “concepts” in which the student must achieve first a minimum, then an optimal knowledge. These concepts are knot management, fixing techniques, anchoring techniques, roping up and handling of the ropes, climbing technique, rappel, fixed rope progression, skiing technique, mountain technique in winter, and gully descent. Selection criteria such as experience in emergency medicine, mountaineering experience, activity in mountain medicine, and professional practice in mountain areas are used for the inscription in Module 1. To enter the following modules, only those candidates who achieve the best evaluations in the previous module will be chosen.

The requirements are well known to all candidates, as official folders with all relevant information for all modules are available to interested doctors. Furthermore, at the beginning of each module, the specific evaluation criteria are again explained and discussed.

All mountaineering skills are monitored and tested by either the professional instructors at the Spanish mountaineering school or the specialized doctors and the experts of the Civil Guard mountain rescue groups, who are the teachers during the sessions in Module 1. Assessment is carried out continuously by a personal tutor, with a complementary final test, if necessary. Results are communicated to candidates in personal talks and are discussed if necessary.

The “optimal mountaineering knowledge” obtained at the end of Module 2 is considered to be of a higher standard than the UIAA model training standard level of a high alpine leader⁵ and higher than the standard level of a professional leader in “media montana” (middle mountains). These degrees are not directly conferred to the participant, as it is not the aim of the course to form mountaineering trainers and leaders but rather, to form

mountain medicine doctors. It is possible, however (and it has been done by 4 participants in the past), to obtain these degrees with a little supplementary effort, which consists of a request of validation and an adequacy test.

Theoretical and practical course in high-altitude and mountain rescue medicine organized by the University of Barcelona

There are no prerequisites; all doctors interested in mountain sports with a good general physical fitness can participate. Two different teaching sessions are offered. These consist of a rock-climbing weekend in a rock school and a weekend of snow and ice climbing in Pirineo. The duration of teaching for each weekend is 30 hours.

Groups are formed based on the experience of the participants (ie, no experience, intermediate experience, and advanced experience).

The mountaineering skills are evaluated by each instructor who controls the safety aspects of the different maneuvers. The following maneuvers are tested at the end of the course in an “in situ” situation: correct handling of the rope and use of carabiners and knots, jumars, and several more technical devices, as well as a descent/rappel with a victim.

The participants are informed as to their results in personal talks. Most participants show excellent practical skills. In only a few cases is there a recommendation to obtain more training and practice.

No mountaineering qualifications are considered equivalent. The practical experience cannot be accepted toward another curriculum in mountain training.

SWITZERLAND

Mountain medicine course offered by the SSMM (Swiss Society for Mountain Medicine) and the medical commission of the SAC (Swiss Alpine Club)

Complete details about the practical aspects of this course have been published as concept articles in mountain medicine.^{3,4}

For this course, there are no prerequisites relative to mountaineering experiences. Even beginners in mountain sports can participate in the Swiss mountain medicine courses.

The practical sessions differ depending on the summer and winter courses. Principally, the usual seasonal mountain sports are practiced, and the appropriate rescues are taught (avalanche rescue in winter and helicopter rescue in summer). In addition, special sessions about orientation and navigation, wilderness rescue, and speleology are held.

The different teaching groups and workshops are formed on the basis of the list of previous climbs the candidates provide. Routinely, candidates with the same interests (eg, alpine climbing, sport climbing, classic mountaineering, trekking, and expedition) and the same level of experience (beginner, intermediate, and advanced) are used to form a group.

Exact practical requirements have been defined by the mountain guides teaching the course and consist of various rock- and ice-climbing techniques for the summer course and skiing in all snow conditions for the winter course.^{3,4} These requirements are communicated to the participants.^{3,4} The required skills are tested by continuous monitoring of the participants by the professional instructor, who acts as a personal mentor to the different group members.

The candidate is informed of his progress in personal talks during and after the different sessions, in which he receives appropriate feedback and attention to optimally develop his personal skills. Different teaching sessions can be organized depending on the needs of the students.

With the exception of the international mountain guide examination, no national or international qualifications are accepted as equivalent to the practical requirements. No option is offered to have the practical education gained in the mountain medicine course accepted toward any curricula of appropriate mountaineering bodies.

UNITED KINGDOM

Three-day course in mountain medicine and altitude physiology organized by P. Barry in association with A. Pollard and Medical Expeditions in North-Wales, at the National Mountain Centre, Plas-y-Brenin

No practical mountaineering training is offered during this course. Nevertheless, the participants can use the indoor climbing wall for personal training and can add a mountain day in Snowdonia on a private basis.

Basic short course organized by D. Syme in Scotland

In general, this course is designed to give family doctors a taste of outdoor medicine and "to whet their appetite for more, if they are interested." The course deals with the specific conditions of the Scottish highlands in winter conditions. There is no requirement for previous experience.

There are 5 practical sessions in the course: 1) general mountaineering—navigation, use of crampons, and use of ice-axe (8 hours); 2) review of CPR with mannequins (2 hours); 3) use of splints and other devices (2 hours);

4) scenarios outdoors, role playing, and acting as a team (2 hours); and 5) simulated rescues with the use of snow-holes and other shelters (8 hours).

There are no specific criteria for the formation of groups, although they tend to be divided by fitness level and mountain experience. No test is required to pass this course.

The questions in relation to the equivalencies to national awards do not apply, since there is no accreditation as a result of this course, and there is no need to recognize other qualifications.

Discussion

Mountain rescue medicine, mountain expedition medicine, and wilderness medicine have recently emerged as powerful new subspecialties of sports medicine. This is due to several facts. First, the general basis of mountain sports is split and gives birth to more and more specific subentities (ice climbing, mixed climbing, biking, rafting, and canyoning). Second, more and more isolated regions of the world are becoming accessible for trekking and mountaineering.⁶⁻⁹ Both facts imply a higher rate of injuries and medical problems with a very special background that can be treated adequately only by the well-prepared and continuously educated physician.

In this respect, interested physicians must have courses to teach them the basics as well as the advanced techniques in theory and practice in this branch of medicine. The first mountain medicine course was created in 1984 in France.¹ Further courses were subsequently organized throughout Europe. At the moment, there are 13 courses in Europe that teach mountain and wilderness medicine. Each course offers a differing organization and philosophy.^{1,2} A general overview of all courses yielded a very high level of interest, with approximately 2600 doctors having had contact with mountain medicine.¹

After the definition of the criteria for the UIAA-IKAR-ISMM label³ and the possibility of awarding the International Diploma of Mountain Medicine, the curricula of the different courses have been analyzed to check for conformity with the general requirements of the certification. The requirements stipulated practical training in mountaineering and climbing techniques to a certain level of proficiency in this practical field. In this respect, the aim of this study was to gather all available information on the teaching and examining of practical mountaineering and climbing techniques in all European mountain medicine courses and to offer a synopsis that would allow for a comparison of the different methods employed.

The results described above show a very wide variation and differentiate the groups into 3 broad categories.

First, courses exist in which no practical mountaineering teaching is offered (The Netherlands and the United Kingdom). Participants receive only a theoretical impression about different medical problems encountered in these settings.

Second, there are courses that offer teaching in practical mountaineering and climbing but that do not qualify for the UIAA-IKAR-ISMM label. Normally, there are no final examinations, or the examinations only lead to a national, very specific degree or proficiency level (United Kingdom, Italy, and France).

Finally, in the group of courses that are internationally certified (UIAA-IKAR-ISMM label), a broad education in the practice of mountaineering and climbing is generally offered. Nevertheless, different philosophies characterize the ideas governing this education. Most courses consider examination to a high proficiency level a very important factor in the training of adequate mountain medicine doctors (Austria, Switzerland, Italy, and Spain). These courses differ in their entry requirements. Two courses ask for specific mountain experience (Italy and Spain), whereas the remaining 2 courses allow all candidates, even complete beginners, to enter the course (Austria and Switzerland). Naturally, it will be much more difficult for novices to pass the tests at the first attempt, but the courses allow a lot of extra time for personal tutoring and give adequate counseling to allow more experience to be gained in the time between courses. Other courses require a minimum level for enrollment and then, during the course, provide more monitoring and optimization of the individual capacities rather than a strict evaluation (France and Spain). Finally, the German course has neither practical entry requirements nor final examinations. The goal of this course is defined to allow participants to counsel their patients going into high-altitude and remote areas rather than to act as rescue or expedition doctors (which, according to the course philosophy, is possible only after several years of education "on the spot").

Considering today's common use of the International Diploma of Mountain Medicine, which, among other things, serves as an entry pass to become an expedition doctor with certain commercial expedition organizers or helps in the selection process for medical workplaces in the high mountains with rescue and wilderness medicine practice, it is quite important to know where the different candidates have gained their experience, as the range of

practical experience taught and examined differs widely between the various courses. Candidates with certain specific aims in mountain medicine can choose, to a certain degree, where to apply in order to obtain the requested knowledge and practical experience, as the various courses concentrate on different points of emphasis. The question can be raised in this context whether mountain medicine doctors ought to pass a central final practical exam with the award of a generally accepted practical proficiency level or whether they should, in addition to their mountain medicine courses, participate in appropriate standardized mountaineering courses with the award, for example, of an international diploma or degree in mountaineering, which would recognize earlier practical education in the field (eg, with the different mountain medicine courses).

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